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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/717,934	11/21/2003	Makoto Terui	OKI.597	7542

20987 7590 09/02/2005

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EXAMINER

BREWSTER, WILLIAM M

ART UNIT	PAPER NUMBER
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2823

DATE MAILED: 09/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/717,934

Applicant(s)

TERUI ET AL.

Examiner

William M. Brewster

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– The MAILING DATE of this communication appears on the cover sheet with the correspondence address –
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 August 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 and 19-32 is/are pending in the application.
- 4a) Of the above claim(s) 4,5 and 7-12 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 6 and 24-28 is/are allowed.
- 6) ☒ Claim(s) 1-3, 19-23, 29-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input checked="" type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. <u>082405</u> |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-3 are rejected under 35 U.S.C. 102(e) as being anticipated by
Farnworth et al., US Publication No. 2004/0113283 A1.

Farnworth teaches a method, in figs. 1A-1K, p. 5, ¶ 113 - p. 8, ¶ 157, of fabricating a semiconductor device comprising:

in fig. 1A, providing a semiconductor wafer 14 having a first surface 20 and a second surface 22 opposite of the first surface, in fig. 1B, the first surface having a plurality of circuit elements 18, in fig. 1C, each of which is defined by scribe lines 28 formed in the semiconductor wafer, p. 5, ¶ 118-122;

in fig. 1F, forming a sealing resin 36 on the first surface of the semiconductor wafer;

in fig. 1J, forming a plurality of external terminals 46 on the first surface of the semiconductor wafer, wherein the external terminals respectively electrically connect to the circuit elements and project from the sealing resin, p. 8, ¶ 154,

in fig. 1J, forming a heat spreading material 26 on the second surface of the semiconductor wafer, after said forming the sealing resin; and
in fig. 1K, separating the semiconductor wafer at the scribe lines after the heat spreading material is formed on the second surface of the semiconductor wafer, p. 8, ¶ 155;

limitations from claim 2, the method according to the claim 1, further comprising polishing the second surface of the semiconductor wafer before said forming the heat spreading material, p. 7, ¶ 144;

limitations from claim 3, the method according to the claim 1, in fig. 1I, further comprising forming a heat conductor 38P on the second surface of the semiconductor wafer, before said forming the heat spreading material, p. 7, ¶ 147;

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 19, 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farnworth as applied to claims 1-31 above, and further in view of Hausmann, US Patent No. 6,104,596.

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in fig. 1J, forming a heat spreading material 26 on the second surface of the semiconductor wafer, after said forming the sealing resin; and

in fig. 1K, separating the semiconductor wafer at the scribe lines after the heat spreading material is formed on the second surface of the semiconductor wafer, p. 8, ¶ 155;

limitations from claim 2, the method according to the claim 1, further comprising polishing the second surface of the semiconductor wafer before said forming the heat spreading material, p. 7, ¶ 144;

limitations from claim 3, the method according to the claim 1, in fig. 1I, further comprising forming a heat conductor 38P on the second surface of the semiconductor wafer, before said forming the heat spreading material, p. 7, ¶ 147.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 19, 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farnworth as applied to claims 1-31 above, and further in view of Hausmann, US Patent No. 6,104,596.

Farnworth does not specify ceramic powder or metal for their films, but Hausmann does. Hausmann teaches

limitations from claim 20, the method according to claim 29, in fig. 1, wherein the heat spreading material 14 includes ceramic powder, col. 3, line 61 - col. 4, line 21, in fig. 3, wherein the material film 14 is attached to the chip 70, col. 5, lines 30-48.

Hausmann gives motivation in col. 1, line 46 - col. 2, line 6. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to recognize that combining Hausmann's process with Farnworth's invention would have been beneficial because it allows less RF energy to be dissipated in the layer, and more RF energy to be transmitted through the layer.

For claim 19, Farnworth does not specify the thickness of the heat spreading material. However, the practitioner may optimize this dimension.

"Normally, it is to be expected that a change in temperature, or in concentration, or in both, would be an unpatentable modification. Under some circumstances, however, changes such as these may impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art . . . such ranges are termed 'critical ranges' and the applicant has the burden of proving such criticality . . . More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation."

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In re Aller 105 USPQ 233, 255 (CCPA 1955). See also In re Waite 77 USPQ 586 (CCPA 1948); In re Scherl 70 USPQ 204 (CCPA 1946); In re Irmischer 66 USPQ 314 (CCPA 1945); In re Norman 66 USPQ 308 (CCPA 1945); In re Swenson 56 USPQ 372 (CCPA 1942); In re Sola 25 USPQ 433 (CCPA 1935); In re Dreyfus 24 USPQ 52 (CCPA 1934).

Note that the specification contains no disclosure of either the critical nature of the claimed dimensions of any unexpected results arising there from. Where patentability is aid to be based upon particular chosen dimensions or upon another variable recited in a claim, the Applicant must show that the chosen dimensions are critical. In re Woodruff, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Claims 21, 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farnworth as applied to claims 1-3 above, and further in view of Sreeram et al., US Patent No. 5,858,145.

Farnworth does not specify using a printing or spray coating for a heat spreading material, but Sreeram does. Sreeram teaches forming a ceramic powder film that may be formed by spraying or printing, col. 3, lines 4-18, and may be applied to a semiconductor wafer, col. 1, lines 43-50. Sreeram gives motivation in col. 1, lines 61 - 67. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to recognize that combining Sreeram's process with Farnworth's invention would have been beneficial because it retains dimensional stability after heating.

Claims 20, 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farnworth in view of Sasov, US Patent No. 6,184,579 B1.

Farnworth teaches a method, in figs. 1A-1K, p. 5, ¶ 113 - p. 8, ¶ 157, of fabricating a semiconductor device comprising:

in fig. 1A, providing a semiconductor wafer 14 having a first surface 20 and a second surface 22 opposite of the first surface, in fig. 1B, the first surface having a plurality of circuit elements 18, in fig. 1C, each of which is defined by scribe lines 28 formed in the semiconductor wafer, p. 5, ¶ 118-122;

in fig. 1F, forming a sealing resin 36 on the first surface of the semiconductor wafer;

in fig. 1J, forming a plurality of external terminals 46 on the first surface of the semiconductor wafer, wherein the external terminals respectively electrically connect to the circuit elements and project from the sealing resin, p. 8, ¶ 154,

in fig. 1J, forming a material film 26 that covers the second surface of the semiconductor wafer, after said forming the sealing resin; and

in fig. 1K, separating the semiconductor wafer at the scribe lines after the heat spreading material is formed on the second surface of the semiconductor wafer, p. 8, ¶ 155;

limitations from claim 31, the method according to the claim 1, in fig. 1I, further comprising forming a heat conduction film 38P on the second surface of the semiconductor wafer, before said forming the material film, so that the material film is formed on the heat conduction film, p. 7, ¶ 147.

Farnworth does not specify that the heat ratio of his heat spreading material is more than the wafer, but Sasov does. Sasov teaches the material film, a thermally conductive tape, having a heat radiating ratio that is greater than a heat radiation ration of the semiconductor wafer, col. 1, lines 12-19. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to recognize that combining Sasov's process with Farnworth's invention would have been beneficial because thermally conductive tape allows for greater heat dissipation which may damage electronic devices.

Claims 30, 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farnworth in view of Sasov as applied to claims 20, 31 above, and further in view of Hausmann, US Patent No. 6,104,596.

Neither Farnworth nor Sasov specify ceramic powder or metal for their films, but Hausmann does. Hausmann teaches

limitations from claim 30, the method according to claim 29, in fig. 1, wherein the material film 14 includes ceramic powder, col. 3, line 61 - col. 4, line 21, in fig. 3, wherein the material film 14 is attached to the chip 70, col. 5, lines 30-48;

limitations from claim 32, the method according to claim 31, in fig. 2, wherein the heat conduction film is a metal 30, col. 5, lines 30-48.

Hausmann gives motivation in col. 1, line 46 - col. 2, line 6. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to recognize that combining Hausmann's process with Farnworth and Sasov's invention would have

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William M. Brewster whose telephone number is 571-272-1854. The examiner can normally be reached on Full Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

William M. Brewster

30 August 2005
WB